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BOOK REVIEW

"Nanoporous gold", A. Wittstock et al. (eds.)

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This newly published book is very professionally printed, in a compact and easy-to-read format, and with colour illustrations. It contains chapters on the history of the porous gold sponges, their optical properties, potential use as sensors or in surface-enhanced Raman scattering, catalysis, and their mechanical properties. From a technological point of view, each of the chapters is detailed and interesting, and would make very valuable reading for individuals interested in porous metal sponges of gold as well as of other elements. References to the literature abound, and yet as well will see, there are some material omissions.

The book contains two chapters on the mechanism of dealloying and a further chapter each on the mechanical properties, microfabrication, optical properties, and potential application of this material as a catalyst, electrocatalyst, actuator, or sensor. Each chapter is packed with information, including illustrations and references.

So does this book have any deficiency? In my opinion, it does. And the clue to what that is may be found in the very first paragraph in Chapter 1, in which it is conceded that, in terms of International Union of Pure and Applied Chemistry usage [1], the materials described in the book could be more correctly designated as "mesoporous". Is this a problem in a community where the word "nanoporous" is often used to describe "mesoporous" materials? It need not be, but in this case this usage has generated some important omissions in the book. Specifically, little if any of the literature on the optical properties, sensor applications, use in ultracapacitors, and catalytic properties of gold sponges designated as "mesoporous" [2] have been included in the book. I concede one might quibble whether some of these omissions were material or not, but in at least two instances they may be. First the chapter in the book on optical properties makes no reference to any of the several papers [e.g., 3–5] on this subject by GB Smith, who has worked for over a decade in this area. Secondly, some prominence in the chapter on catalysis is given to the "discovery" of the catalysis of CO oxidation by this material by two groups, in Europe and in the USA in 2006 and 2007, respectively. However, this discovery had already been presented at the Gold 2003 conference in Vancouver [6] and at the Asia Pacific Nanotechnology Forum in Cairns that year [7] and some international patents on this combination of catalyst and reaction were filed by investigators at South Africa's Mintek around that time too [8].

As pointed out in the present book, catalysis by a gold sponge would be scientifically interesting because it appears to violate the principle that gold requires the presence of an adjacent oxide too in order to be an effective catalyst. The puzzle was informally discussed between delegates several times at Gold 2003 and then again at Gold 2006. One possible resolution of the puzzle would be that the catalytic capability of these sponges is due to the interaction of the Au with some residual impurity (Al or Al_2O_3 in the case of gold catalysts made in an analogous fashion to Raney nickel, or Ag or Ag_2O in the case of the gold made by dealloying Au–Ag solid solutions).

Nevertheless, these omissions aside, this is a great book and well worth getting if you work in this field or intend to enter it. But do also search the scientific literature using the

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"mesoporous" keyword too or otherwise you will only be getting part of the story!

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